



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/632,234

07/31/2003

Kevin W. Wenzel

02-IMP-076

2548

29393

7590

06/10/2004

ESCHWEILER & ASSOCIATES, LLC
NATIONAL CITY BANK BUILDING
629 EUCLID AVE., SUITE 1210
CLEVELAND, OH 44114

EXAMINER

QUASH, ANTHONY G

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 06/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | | |
|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/632,234 | | WENZEL ET AL. | |
| | Examiner | | Art Unit | |
| | Anthony Quash | | 2881 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>7/31/03</u> . | 6) <input type="checkbox"/> Other: ____ |

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 33-35,43,45, are rejected under 35 U.S.C. 102(b) as being anticipated by Sato Katsuaki [JP 06-089690]. As per claims 33,43, Sato Katsuaki [JP 06-089690] discloses a method/apparatus for providing ion beam containment in an ion implantation system, the method/apparatus comprising a photoelectron source located along at least a portion of the passageway, and a photon source providing photons to at least a portion of the photoelectron source to cause emission of photoelectrons from the photoelectron source. See Sato Katsuaki [JP 06-089690] abstract, and figs. 1-3.

As per claim 34, Sato Katsuaki [JP 06-089690] discloses the photoelectron source comprises an inner wall of a beam-guide defining the passageway. See Sato Katsuaki [JP 06-089690] abstract, and figs. 1-3.

As per claims 35, 45, Sato Katsuaki [JP 06-089690] discloses the photon source comprises at least one lamp providing light to the photoelectron source. See Sato Katsuaki [JP 06-089690] abstract, and figs. 1-3.

As per claim 46, Sato Katsuaki [JP 06-089690] inherently discloses that providing the photons to the photoelectron source having an energy exceeding a work function of the photoelectron source. See Sato Katsuaki [JP 06-089690] abstract, and figs. 1-3.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18,21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690]. As per claim 1, Benveniste [6,541,781] teaches an ion implantation system comprising an ion source (112) adapted to produce an ion beam along a path, a beam-line assembly (115) located downstream from the ion source all the path (see fig. 1B), a beam-guide defining a passageway through which the ion beam is transported along the path, and an end station located downstream from the beam-line assembly along the path, the end station being adapted to support at least one wafer along the path for implantation using the ion beam. See Benveniste [6,541,781] fig. 1b, abstract, and col. 8 lines 25-35. However, Benveniste [6,541,781] does not explicitly state a photoelectron source being located along at least a portion of the passageway and a photon source providing photons to at least a portion of the photoelectron source to cause emission of photoelectrons from the photoelectron source. Sato Katsuaki [JP 06-089690] does teach a photoelectron source being located along at least a portion of the passageway and a photon source providing photons to at least a portion of the photoelectron source to cause emission of photoelectrons from the photoelectron source. See Sato Katsuaki [JP 06-089690] abstract, and figs. 1-3. Therefore, it would have been obvious to a

person of ordinary skill in the art at the time the invention was made to have a photoelectron source located along at least a portion of the passageway and a photon source providing photons to at least a portion of the photoelectron source to cause emission of photoelectrons from the photoelectron source in order to aid in the neutralization/containment of ions.

As per claim 2, Sato Katsuaki [JP 06-089690] teaches the photoelectron source comprising an inner wall of the beam-guide. See Sato Katsuaki [JP 06-089690] figs. 1-3 and abstract.

As per claims 3,16, Sato Katsuaki [JP 06-089690] teaches the photon source comprising at least one lamp providing light to the photoelectron source. See Sato Katsuaki [JP 06-089690] figs. 1-3 and abstract.

As per claims 4,17, Sato Katsuaki [JP 06-089690] inherently teaches the at least one lamp providing photons to the photoelectron source having an energy exceeding a work function of the photoelectron source. See Sato Katsuaki [JP 06-089690] figs. 1-3 and abstract.

As per claims 5,18, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] teach all aspects of the claim except for explicitly stating that the at least one lamp provides ultraviolet or visible light to the photoelectron source. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the at least one lamp provide ultraviolet or visible light to the photoelectron source, since it has been held to be within the general skill of a worker in the art to

Art Unit: 2881

select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim, 6,9, Benveniste [6,541,781] teaches the inner wall of the beam-guide comprising aluminum. See Benveniste [6,541,781] col. 7 lines 45-60.

As per claims 7,8,10, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] does not explicitly state that the inner wall of the beam-guide comprises lanthanum hexaboride. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the inner wall of the beam-guide comprise lanthanum hexaboride, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 11,21,36, Benveniste [6,541,781] teaches the beam-line assembly further comprising a magnetic device adapted to provide multi-cusped magnetic fields in at least a portion of the passageway. See Benveniste [6,541,781] col. 8 lines 3-17.

As per claims 12,22, Benveniste [6,541,781] teaches the magnetic device comprising a plurality of permanent magnets located along at least a portion of the passageway. See Benveniste [6,541,781] col. 8 lines 3-14.

As per claim 13, Benveniste [6,541,781] teaches the plurality of magnets being mounted along an outer surface of at least one beam-guide wall. See Benveniste [6,541,781] col. 10 lines 45-50.

As per claims 14,23, Benveniste [6,541,781] teaches the beam-line assembly further comprises a mass analyzer through which a portion of the beam-guide passes,

the mass analyzer being adapted to receive the ion beam from the ion source and to direct ions of a desired charge-to-mass ratio along the path toward the end station.

See Benveniste [6,541,781] abstract, figs. 1b, 3b, col. 4 lines 50-65, col. 8 lines 25-55, and col. 13 lines 5-10.

As per claims 15,24,37, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] teach all aspects of the claim except for explicitly stating that the photoelectron source and the photon source cooperatively provide photoelectrons in the portion of the beam guide which pass through the mass analyzer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the photoelectron source and the photon source cooperatively provide photoelectrons in the portion of the beam guide which pass through the mass analyzer in order to provide containment of the ions and neutralized any stray ions.

As per claim 25, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] teach all aspects of the claim except for explicitly stating that the photoelectron source is spaced from a wall of the beam guide. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the photoelectron source spaced from a wall of the beam guide, since it has been held that rearranging parts of an invention involves only routine skill in the art.

Claims 19-20,31-32,41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] as applied to claims 1,33 above, and further in view of Brown [4,714,860]. As per claim 19, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] teach all aspects of

the claim except for explicitly stating that the photoelectron source comprise aluminum. Brown [4,714,860] teaches a photoelectron source being comprised of aluminum. See Brown [4,714,860] col. 5 lines 38-65. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a photoelectron source be comprised of aluminum, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 20, Brown [4,714,860] teaches the photoelectron source comprising lanthanum hexaboride. See Brown [4,714,860] col. 5 lines 38-65.

As per claim 31,41, Brown [4,714,860] teaches the photon source comprising at least one laser. See Brown [4,714,860] col. 5 lines 40-65.

As per claims 32,42, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] and further in view of Brown [4,714,860] teach all aspects of the claims except for explicitly stating that the beam-guide comprise at least one window and wherein the photon source is located outside the beam-guide to provide photons to at least a portion of the photoelectron source through the at least one window. Brown [4,714,860] does teach that a laser can be used to liberate photoelectrons from a material. See Brown [4,714,860] col. 5 lines 39-65. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the beam-guide comprise at least one window so that a photon source located outside the beam guide would provide photons to at least a portion of the photoelectron source through the at

least one window so that a laser may irradiate the photoelectron producing material in order to provide photoelectrons that would neutralize the ions in the beam.

Claims 26-30,38-40,44,47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] and further in view of "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries. As per claims 26,38,48, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] teach all aspects of the claim except for explicitly stating that the apparatus further comprise a conductive sheath spaced from the photoelectron source, wherein the photoelectron source is biased with respect to the conductive sheath. The "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries does teach a conductive sheath spaced from the photoelectron source, wherein the photoelectron source is biased with respect to the conductive sheath. See "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries pages 528-530, and figs. 11.5-11.17. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have a conductive sheath spaced from the photoelectron source, wherein the photoelectron source is biased with respect to the conductive sheath in order to aid in the confinement and guidance of the beam.

As per claim 27, Benveniste [6,541,781] in view of Sato Katsuaki [JP 06-089690] and further in view of "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries teach all aspects of the claim except for explicitly stating that the conductive sheath comprise at least one opening. It would have been obvious to one of ordinary

skill in the art at the time the invention was made to have the conductive sheath comprise at least one opening in order to allow for photoelectrons from the photoelectron source to enter and help confine and focus the beam.

As per claims 28-30,39,44,47,49, The "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries teaches a magnetic device adapted to provide multi-cusped magnetic fields in at least a portion of the passageway, and at the photoelectron source to enhance emission of photoelectrons. See The "Acceleration and Transport of Neutralized Ion Beams" by Stanley Humphries 528-530, and figs. 11.5-11.17.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

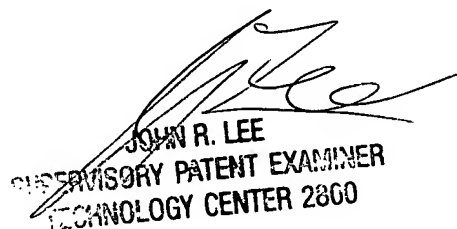
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash



6/3/04



JOHN R. LEE
ASSISTANT PATENT EXAMINER
TECHNOLOGY CENTER 2800